

A honeybee is shown in flight, carrying a yellow pollen sac on its abdomen, positioned between several bright yellow flowers. The background is a soft, out-of-focus green. Large, elegant yellow swirls are overlaid on the right side of the page, framing the text.

LET THEM

Bees can be dangerous, but their wrath is nothing like their reputation. Besides, we need bees. Especially honeybees, which play a vital role in the pollination of the nation's fruits and vegetables. Unfortunately, some domestic bee populations have plummeted, but Arizona, because of its climate, has the potential to be a national honeybee hub.

BY TERRY GREENE STERLING

PHOTOGRAPHS BY EIRINI PAJAK

I. THE SWARM

It happens in mid-April, on one of those unhurried afternoons usually punctuated by nothing more dramatic than a soft breeze toting earthy scents of the pink and yellow blossoms canopying our desert garden. Two kids on bikes ride down the empty street. Music wafts out of a neighbor's open window.

Suddenly and seemingly out of nowhere, a dark cloud of bees darkens the sky and fixes onto an exterior wall of our house. The insects rapidly form a thick, quivering, placenta-shaped cluster on the aged stucco. Like Hitchcock movie characters, we stare through the window at the weirdly mesmerizing swarm that has transformed itself into one shivering organism. After a half-hour or so, the bees begin hightailing it into a crack between the ceiling and the roof. Soon, the entire swarm disappears.

Like just about every other resident of the Phoenix metro area, where bees have swarmed and been exterminated prodigiously in the past few years, we've been saturated by news stories about Arizona's Africanized, or "killer," honeybees. Decades ago, the stories go, their bee ancestors were transported from Africa to South America. Some escaped their South American homes and slowly migrated north. Now they're in Arizona, where they attack dogs and people.

We have a dog. We are people. We should call an exterminator.

But we're conflicted.

Bees can be dangerous — the Centers for Disease Control and Prevention reports as many as 90 to 100 Americans die of bee, wasp, hornet, ant and scorpion stings each year. Thousands more are stung but

survive. On the other hand, humans need bees. Native pollinators are on the decline in many places, and many domestic bee populations have plummeted for more than a decade. Honeybee pollination is essential for the production of many of the nation's fruits and vegetables. And much of the food Americans swallow relies, to some extent, on bees.

There are domesticated honeybees, some as gentle as lambs, and feral honeybees, which descend from domesticated bees that went wild, like the so-called "killer" bees. Both domesticated and feral honeybees carry the DNA of ancestors transported to the Americas from the Old World. In many places, domesticated honeybees are trying to fill in for native pollinators, which face stresses from climate change, pesticides and loss of habitat.

So, no, we can't bring ourselves to call the exterminator. Instead, I pick up the phone and call a guy named Tim.

With that call, I plunge headfirst into Arizona's controversial, counterintuitive apian universe, where I'll meet tens of thousands of bees under various circumstances. I'll also meet the men and women battling to save bees in a state that, thanks to its climate, could be a national honeybee hub — but isn't, for odd reasons.

II. THE URBAN BEEKEEPER

After a few texts and phone calls, beekeeper Tim Moore pulls into our driveway, inching along in a white Dodge Ram pickup with a license plate that reads, "BEE FARM." The truck tows a covered white trailer that reads, "Honey Hive Farms." Every spring, Moore loads

this trailer with boxes of bees he's presold online. He delivers them to purchasers in places such as Home Depot parking lots in several states, including Missouri, where he was born and grew up. After building a résumé that includes ironwork, race-car repair and home remodeling, Moore went into beekeeping full time. He still has a bee facility in Missouri. He also has beehives with a broker in California, where his bees pollinate almond trees.

He's kept bees for about eight years and is now 47. He's skinny, all legs and arms and nervous energy, even in his white bee suit with the netting hanging over his porkpie-like beekeeper's hat. On this first visit, he stands on a metal stepladder, using a "bee vacuum" to remove about half the bees out of the crack in our house. He gently shakes the confused insects into a covered bucket.

Plenty of unvacuumed bees, though, either dive-bomb Moore or remain in the crack. Moore has to outsmart the bees — no easy task. "Bees make choices constantly," he says. "You can't make them do anything." Eventually, most of the insects migrate into a honey-scented, slatted, covered wooden box — their new portable hive — strapped to the metal stepladder. It takes several visits to remove the bees completely. After Moore takes the bees away (he hopes they will produce honey he can sell, and breed successfully so he can populate new hives), he boards up the crack so we won't get more apian squatters.

A few days later, Moore, photographer Eirini Pajak (she's also a beekeeper) and I jump into the Ram and roar through the Phoenix suburbs, past McMansions, the



CLOCKWISE FROM LEFT: Honeybees congregate on a brood comb, the part of the hive where the queen bee lays eggs; the cells of the comb contain brood at various stages of development. Protected by a bee suit, beekeeper Tim Moore opens a feisty hive at a farm in the Phoenix area. Moore's son, Alex, watches as Moore tends the bees at the family's home. Queen bees hatch from special cells; here, the first two cells show where a queen hatched successfully, while the third was ripped open by a rival queen.



Wildlife World Zoo, a Dick's Sporting Goods warehouse and farm fields bordered by tall, fragrant eucalyptus trees. Urban beekeepers in Arizona often face the problem of finding safe places for their bees to forage. Places where the beehives won't get shot with guns, doused with pesticides or otherwise destroyed. Places where bees can forage peacefully on a variety of plants, breed and make lots of honey.

We park in the outer stretches of an organic farm, where Moore keeps several hives, and step into bee suits. I'm small; the suit I borrow from Moore is way too large. To keep bees from stinging



me, we tape the legs tight and securely fasten the Velcro on the neck and sleeves. Next, I put on a baseball cap with a neck protector, and over that I don the porkpie hat with face netting. I squeeze my hands into heavy gloves. This is a good thing. When

Moore opens the portable hives and inspects each slat, the bees become extremely defensive. They attack our bee suits. *Plink. Plink. Plink.* There's a reason for this behavior. Each hive likely contains honey, pollen, a queen laying thousands of eggs, and



her brood in various stages of development. The bees aren't being mean or vicious; they're defending precious assets.

I learn, though, that hives tend to have different personalities. Some can be extremely defensive; others, not so much. To change the personality of a hive, some beekeepers kill the queens in particularly defensive hives. They then insert a box, plugged with sugar, that confines a less defensive queen, generally one of European descent. The worker bees (which, incidentally, are all females) nibble away at the sugar plug. By the time they spring the placid replacement queen from her sugary prison, they're used to her scent and generally accept her.

Moore wants to check on hives his friend put out in the creosote flats a few miles away from the organic farm. There's a canal nearby where bees can water, but the set-

ting is grim. The desert, so close to Phoenix, is littered with shotgun shells, soda cans, plastic bottles. When we spot the portable hives — those white, slatted, covered boxes — we see melted wax, dead bees and honey pouring onto the sand. In the extreme heat, the bees in all but one portable hive have died, perhaps because Moore's friend



did not properly vent them. "I feel sick to my stomach," Moore says.

I'm wondering if some of our former bees are among the recently deceased, but Moore insists those bees now reside by his house. Moore lives in a suburban housing development on an artificial lake. In his small yard, behind the strawberry plants and barbecue, bees fly into and out of man-made hives. Moore's young son, Alex, studies them through a window, and I can't help but wonder whether he will inherit a world with bees when he grows up.

III. A FARMER AND HIS BEES

On a hot July morning, Jaime de Zubeldia leads me past water catchment basins and swales, and past clumps of cholla and prickly pear cactuses, pomegranate and orange trees, sunflowers,

chickens that lay chocolate-brown eggs, turkeys, goats, his ramshackle and book-filled manufactured home, tidy equipment sheds and the trailer where volunteers from all over the world come to learn organic, sustainable farming and the key role bees play in such operations. It's all part of an intriguing agricultural endeavor called ReZo-Nation Farm, a small plot of sandy desert in the flatlands of Avra Valley, some 30 miles west of Tucson. The goal: to "re-embed" people in collaborative, productive farming systems. That includes reintroducing people to the importance of beekeeping.

A former civil engineer, de Zubeldia takes prodigious notes on everything — from egg harvests to the temperament of honeybee hives — to improve his farming techniques. Now 42, de Zubeldia runs the farm with his wife,



Kara, and they live there with their young son, Sebastian. Bees are a family tradition — de Zubeldia grew up on a "tiny, tiny farm" not far from here, and his father kept a beehive. His earliest recollections of bees include smells — the "earthy, sweet, yeasty" scent of honey harvests and the citrus-tinged pungency of beeswax.

Honeybees are an integral part of his farm. By its second year, one hive can produce 75 to 100 pounds of honey. And bees, of course, pollinate plants. De Zubeldia has

CLOCKWISE FROM LEFT: Jaime de Zubeldia, a beekeeper and the co-founder of ReZoNation Farm west of Tucson, inspects a hive. Before removing the hive, de Zubeldia prepares a smoker to calm the bees. De Zubeldia fills a jar with honey he processed at the farm. Beekeeper Fred Terry tends his hives amid the prickly pear cactuses outside of Oracle.

placed hives in strategic locations — in partial shade in the summer and sunny spots in the winter, near water sources, in places where human and bee pathways don't intersect. Highly defensive hives are placed farther out in the desert, for obvious reasons. He studies the personalities of hives and strives, through selection techniques, to breed bees with "desirable traits."

Arizona beekeepers sometimes buy their queens from breeders, but de Zubeldia rarely uses commercially bred queens. Instead, he selects queens from his more docile hives to replace queens in his more defensive hives. Ditto for drones, the male bees that don't do much but eat and have sex.

Very often, he has to mollify panicked homeowners

during bee removal jobs. He has to explain that swarms of bees are actually bees looking for a new home, and swarms don't usually attack. After all, they've got nothing to defend. Hives, on the other hand, are established homes that bees will defend if they feel they have to.

A slender, talkative guy with a head of thick brown hair, de Zubeldia is famous in Southern Arizona for his beekeeping classes. In a fractured bee community, his big idea is collaboration. If beekeepers are more strategic in sharing knowledge, he figures, they'll be more likely to improve genetics of honeybees. That could translate to healthier, less defensive honeybees that produce larger populations and more honey.

"People latch onto these very interesting insects," he

says. "You can keep them in a box, and if you take care of them, they give you hundreds of pounds of honey and even wax.

"What could be better, you know?"

IV. THE HONEY MERCHANT

Fred Terry is 65 years old and doesn't seem to care much about the temperament of his honeybees, just as long as they're healthy and reproducing and making honey. They're far out in the desert, miles away from his home in Oracle. Here, they forage on pure Sonoran Desert plants. Terry checks on them regularly, hauls gallons of water in his vintage pickup and dumps it into a tank purified by water hyacinths.

He figures he's got about 10 million bees out in their

BELOW: Fred Terry makes a tincture out of propolis, a kind of bee mortar, gathered from his hives outside of Oracle.

BOTTOM: Terry inspects a honeycomb for straggler bees before processing it. Terry, who has kept bees for 40 years, says his craft “does not destroy, but rather makes more life possible.”



secret desert hiding place. He prefers his Africanized feral bees to more docile European bees. The Africanized bees are less prone to disease, he says, and are marathon honey and wax producers. In fact, they produce so much honey and wax it takes him “about three to four months of 12- to 16-hour days, seven days a week,” to harvest the stuff.

I meet up with him at his favorite farmers market in Tucson, where for 15 years he has made a living selling bottles of catclaw acacia and fairyduster honey, along with pollen, honeycomb, organic beeswax and a cream made of olive oil, coconut oil, cocoa butter and propolis — a sort of bee mortar, made from plant material, that is considered medicinal in some circles. Terry takes the products to

the market in his old white Chevy, and I think to myself that it’s a pretty modest living for a guy who attended the Thunderbird School of Global Management.

But Terry seems satisfied. He’s kept bees for 40 years because, he tells me, “I think this is a kind of job, a kind of activity, a craft that does not destroy, but rather makes more life possible, and I kind of like that.”

V. THE BEE SCIENTISTS

The defensive bees I met in the desert with Tim Moore contrast mightily with the mellow European honeybees residing in hives in a gravel yard outside Arizona State University’s Honey Bee Research Lab in Mesa. I’m not wearing a bee suit, although

one was offered. I’m not afraid of getting stung.

“They’re sheep,” Dr. Osman Kaftanoglu, the 62-year-old project manager of the bee lab, says fondly. With a small bellows on a hand-held smoker, he blows a tiny puff of smoke onto a bee-covered slat he’s pulled from a hive with his bare hands.

ASU’s bee scientists want to help the struggling bee industry locally and globally. Kaftanoglu, for instance, focuses his research on honeybee reproduction physiology and honeybee sperm biology.

On ASU’s Tempe campus, in the ultramodern Interdisciplinary Science and Technology Building, there’s a sign on a window that warns about beehives and urges people sensitive to stings to call 911 if they are stung. I see the white

portable beehives outside, on a flat section of roof.

I’m here to visit Dr. Gro Amdam, a professor in the School of Life Sciences who runs shipshape, well-disciplined bee research labs at ASU and in Norway. Amdam is part of ASU’s prestigious Social Insect Research Group.

Amdam led an ASU study in which nurse bees were taken out of hives, leaving the helpless queens and the brood alone. Foraging bees, the ones that fly out to harvest pollen and nectar and get beaten up on the job, saw there were no nurse bees in the hive when they got home from work. So they became nurse bees. The result: About half of the foragers-turned-nursemaids reversed their brain aging. And since bees and humans share some of the same brain proteins, further research could help us understand the secrets of our aging brains.

In 2015, Amdam and Dalia Freitag, a University of Helsinki scientist, and a team of researchers discovered bees immunize their brood with a critical protein passed into the eggs by the queen. The groundbreaking research has huge implications for creating a vaccine to fend off deadly bee diseases.

In Amdam’s ASU office, a wall is decorated with framed covers of prestigious journals where Amdam and her colleagues have published their findings.

She’s talking about the stresses bees might endure when they’re transported from one state to another to pollinate crops. She calls it a recipe that “smells of disaster.”

“When you move bees a lot, you have to transport them on trucks or big trailers, and during this time, they often

eat a suboptimal diet of high fructose corn syrup,” she explains. Next, once the bees begin pollinating, “it’s only one crop as far as the eye can see. ... It would be like you ate one thing for two weeks.” And on top of that, bees have the “kindergarten effect” of exchanging diseases with bees from different hives at the pollinating site.

What’s more, “we are sometimes asking bees to pollinate crops sprayed by insecticide,” she adds. “That doesn’t make any sense. Now you have bees dying of the stresses, more demand on them and fewer beekeepers. How do you solve that?”

With young beekeepers like Nick Baker, she suggests.

VI. THE COMMERCIAL POLLINATOR

Nick Baker and I stand behind a shopping center in a secret Phoenix location. He likes to keep his bees near shopping centers because the landscaping provides good, varied forage. The drip systems provide water for the bees. I can’t tell you where we are because someone might mistake his mellow European bees for feral bees and destroy them.

But the hives are untouched. Baker’s happy because the bees are healthy and well nourished and reproducing. The brood smells like fresh clover.

Our visit to another hive cluster isn’t so pleasant. Some dead bees lie in the dust. He suspects they foraged in backyards sprayed with pesticides, because their tongues hang out, as if they died gasping.

Baker, 36, loves his calling despite its challenges. After researching bees for several years with Amdam, he opted to become a commercial polli-



nator. “I miss doing science,” he says, “but overall, I like being outside more than anything else.” On this September afternoon, he’s got no inclination to don a cumbersome bee suit; he handles his bees in jeans, a white shirt and a red Sun Devils hat.

He takes his hives to places like California, to pollinate almond trees, and Texas, to pollinate pumpkins. He feeds his bees nutritional “patties” for six weeks prior to the stressful truck rides on the interstates. As a result, the bee colonies are strong and hardy when they set out on pollinating trips.

Sometimes, when the bees aren’t pollinating commercially, Baker harvests and processes honey in a giant extractor in an immaculate storage unit. He sells it wholesale to honey retailers.

Times are tough, but maybe

TOP: Eschewing protective gear, Dr. Osman Kaftanoglu handles a hive at Arizona State University’s Honey Bee Research Lab in Mesa.

ABOVE: Kaftanoglu inspects some of the bee specimens in the lab’s freezer. The lab’s research includes working toward a vaccine to fend off bee diseases.

someday Baker can build his business up to six figures. Like de Zubeldia, he believes collaboration would do his profession, and the bees, a lot of good. The need is great: In 1947, there were 6 million managed honeybee colonies in the United States; in 2014, there were 2.5 million such colonies. Arizona, with its warm climate and abundant pollens, could host a thriving bee industry if only people worked together.

“There are so few of us,” Baker laments as we drive to my car. “Why not work together and come up with solutions together?” **AH**