

The World of Beekeeping

YUKO QUERY

WRITER'S COMMENT: I've been fascinated with bees since I was a kid. I heard the constant buzzing of our neighbor's hive boxes, liked finding miniature combs under our roof's overhang, and always welcomed a new jar of honey. Wanting to learn more about the honey-makers, I took advantage of writing an article on beekeeping in Dr. Boe's journalism course. I finally had a good excuse to go explore the world of bees. From speaking with beekeepers Mike McDonald and Jordan Thompson, I learned how bees and beekeepers work, how to keep calm in a swarm, and best of all, how honey is made. But what I learned most importantly is that one can write an article on anything—even something as small as bees. I hope that many of you will enjoy reading this article as much as I had fun writing it. In the future I look forward to having a backyard with two hive boxes, a smoker, and of course, my very first batch of honey.

—*Yuko Query*

INSTRUCTOR'S COMMENT: Successful feature articles are like successful salads. Sure, you can just put some lettuce in a bowl and call it a salad, but if you add tomatoes, cheese, nuts, garbanzo beans, beets, cucumbers, and so on, you end up with what in my family we call a deep salad. Yuko Query started her feature with an interesting subject, beekeeping, the lettuce as it were. Then she added interviews with three beekeepers, information from two books and three websites, details about the royal jelly eating habits of the parents of her journalism classmate Maria Choung, plus her own experience doing actual beekeeping. She ended up with a deep feature article full of interesting information (for example on the sex life of bees and the allergy fighting properties of honey), dramatic scenes, and striking quotations. The end result is in the John McPhee tradition of the literature of fact.

—*John Boe, University Writing Program*

HONEY's always been in my cupboard, but I didn't know a thing about the creatures that make it except that one summer, a swarm of bees nested in my bedroom walls, chewed through the drywall, and buzzed around my room, leaving ten-year-old me terrified.

Over ten years have passed since the bee invasion and I fear bees no more. Rather, I've become fascinated with them—especially after reading Sue Monk Kidd's *Secret Life of Bees*. So to find out about bees and what honey is really all about, I went straight to the source: real beekeepers.

Meet Mike

WITH GRAY hair and deep wrinkles from years of beekeeping wisdom, 62-year-old Mike McDonald sells nuts and honey at the Davis Farmer's Market. Mike and his wife Anne have been managing



Mike McDonald at his nuts and honey stand

bees for ten years. “We originally needed bees for pollinating almonds,” explained Mike. “We found that we like dealin’ with the little critters—and the next thing you know, we’re beekeepers!”

And after keeping bees for several years, the McDonalds have perfected their blend of honey. Star thistle, eucalyptus,

safflower, alfalfa—Mike uses a wide variety of wildflowers for extracting nectar. Honey tastes a certain way because of the flowers.

“Bees go to any plant that has a flower,” explained Mike. “You’ve got no control over the nectar, but you can regulate honey production by *where* you put your hive.” So Mike puts his hive boxes somewhere between star thistle and alfalfa and hopes for the best.

Even though Mike uses the bees to help produce almonds, the nectar of almond plants is not used to produce honey. “Almond honey tastes terrible,” said Mike shaking his head. “It’s very bitter.” So at their farm in Capay Valley, Mike and Anne have been sticking

with their wildflower recipe to produce McDonald Orchards' pure local honey.

Setting up the Supers

MAKING HONEY requires tedious work for the beekeeper as well as the bees. First, hive boxes, called supers, are assembled. Several hours can be spent putting together boxes, wiring foundation frames, and nailing wooden slides. The hive is one unit, "like the human body," explained Mike, "like how different parts of the body produce different enzymes and proteins."

A hive looks like a miniature tower with one super stacked upon the other. The brood—young bees, larva, and eggs—dominate the bottom hive, while nectar and pollen collect in the top. Hearing Mike talk about stacking boxes reminded me of playing with wooden blocks as a kid. I wondered how many supers I'd be able to stack without having them fall apart.

In every hive, a wire rack known as the queen excluder divides the upper and lower supers. Small enough for worker bees to get through to forage for nectar, it prevents the queen from leaving her nest, isolating her in the hive to lay eggs. Knowing that there is a way to the outside world, the queen can't squeeze her big butt through the door.

With supers, frames, and queen excluders, a beekeeper creates an artificial habitat for the bees. Without hurting or killing the hive, a person can transport the boxes to different locations. But some animal-rights-vegans are downright upset. A few believe that beekeeping is enslaving bees. "No," laughed Mike. "Beekeeping has enslaved us!"

Well before he even begins to think of extracting honey, a beekeeper invests a lot of time and money to set up the supers and get situated. To start with, a beekeeper can expect to pay three-hundred dollars or more for bee farm equipment. And to set up your



The queen excluder placed on top of the lower hive box.

personal honey factory and keep it running smoothly costs hundreds of additional dollars.

“Costs about eighty or so dollars for a three-pound box of bees with the queen and workers,” explained Mike. I asked how many bees are in a three-pound box.

“Two hundred!” exclaimed a woman holding Mike’s jar of honey and almonds ready for purchase. Mike laughed and shook his head. “Oh, no, there’s got to be more than that—maybe a couple thousand?” Neither was sure, so I did my homework.

To find the bee’s weight, I went online and found the University of Montana’s bee trivia website. According to UM’s faculty and staff, nine to ten bees are equivalent to one M&M, which is approximately 0.878 grams of chocolate. So divide the weight of an M&M by ten bees and one bee would weigh 0.0878 grams. Do the math, and Mike’s three-pound box of bees contains approximately 15,498 bees.

In addition to the cost of supers and the bees themselves, the U.S. Postal Service charges special fees: starting at one hundred dollars to ship bees anywhere in the U.S. And then additional fees for regulated delivery are needed to get the bees safely to the owner and placed into the hive boxes. Sometimes, bees are even insured. But veteran beekeeper Mike said that with his bee supplier, he didn’t have to pay extra shipping fees—he just paid for the box of bees.

Let’s recap and talk money. A box of bees starts at eighty dollars. A super starts at three hundred dollars. A pair of leather gloves: about twenty bucks. A bee jacket: eighty-nine dollars. If you want the full-body suit with the adjustable veil, there’s another hundred and twenty dollars. Deluxe stainless steel smoker: thirty dollars. Smoker fuel: \$2.75. Bee brush and hive scraper: \$16. One frame: \$2 to \$3. But you’ll need to buy ten because ten frames go in a hive box. *The Beekeeper’s Handbook*: \$26.95. And if you’re able to borrow someone else’s spinner to extract the honey from the frames and are buying the *cheaper* suit, your total comes to . . . \$586.70. You’ll look at your first jar of honey and think: six hundred dollars.

Once the supers and bees are set up, it’s time to manage the bees. Bees are extremely delicate, sensitive to movement, noise, and temperature. The beekeeper needs to find an ideal location for them—not too hot and not too cool. Even in a shady area, the

temperature and humidity can rise during the hot summer months. Bees can react to the hot weather and create a hazardous swarm.

Bees also need a lot of love and kindness. And the beekeeper needs patience, sensitivity, and nerves of steel.

Bee Lingo and the Wiggle Dance

BEES COMMUNICATE to other worker bees by quick, rapid body movements—bees *dance*. In *The Honey Bee*, James and Carol Gould write, “The whole fabric of honey bee society depends on communication—on an innate ability to send and receive messages, to encode and decode information.” Returning from finding the best nectar to produce honey, a bee wiggles in different directions to relay their findings to others.

“Let’s say there are two bees that scout for nectar,” explained Mike. “One goes to the clover and the other to alfalfa.” The field force bees that return to the hive box with nectar from different plants share a taste test among fellow worker bees. Then the bee carrying the best nectar is chosen like a kid being picked onto a dodge-ball team. The chosen bee then wiggles its body, signifying the location and distance of the prized nectar and points its head in the right direction. Once the bees decode the information, hundreds of bees take off in flight to try to find the winning flower and make an exquisite batch of honey.

Jordan Thompson

STANDING IN a swarm of bees flying several feet high, 22-year-old Jordan Thompson closed the box of a recently captured beehive and placed it on the back of a green Ford truck. Bees adorned her wavy pulled-back hair and left red sting marks across her left cheek.

Capturing a swarm of bees that terrorized the children’s playground, she was the hive-capturing hero of the Davis Farmer’s Market. As she wiped the sweat from her forehead and scratched her unshaven legs, she described her work with bees. “I just got started,” she explained. “I work with bees at the Domes on campus.” But as she began talking about queen bees, drones, worker bees, and smokers, I was more concerned with the bees crawling across

my chest. “Here’s another one,” she said smiling, picking a bee off my shoulder. I was in the presence of a calm, student-beekeeper.



Jordan Thompson and her dome at Baggin’s End.

Jordan Thompson leads a somewhat ordinary life among the bees, except that she lives in a dome on the Western edge of campus with no cable or television. The fourteen polyurethane-plaster-fiber-glass domes make up a community known as “Baggins End” with students studying al-

ternative agriculture techniques. Her hands sticky from beekeeping, Jordan said, “When working with the bees, you have to be really calm and really patient.” To illustrate, she shared with me a passage from one of my favorite books, *The Secret Life of Bees*, by Sue Monk Kidd:

On our first Friday evening there, after prayers were finished and orange and pink swirls still hung in the sky from the sunset, I went with August to the bee yard. I hadn’t been out to the hives before, so to start off she gave me a lesson in what she called “bee yard etiquette.” She reminded me that the world was one big bee yard, and the same rules worked fine in both places. Don’t be afraid, as no life-loving bee wants to sting you. Still, don’t be an idiot; wear long sleeves and long pants. Don’t swat. Don’t even think about swatting. If you feel angry, whistle. Anger agitates, while whistling melts a bee’s tempter. Act like you know what you’re doing, even if you don’t. Above all, send the bees love. Every little thing wants to be loved.

I fell in love with the bees,” explained Jordan. “I think they’re beautiful. You can’t fear something like that.”

Safety Gear or Lack Thereof

A BEEKEEPER's gear looks somewhat like a Ghost Buster's. Except instead of a grey suit, you wear white. And in place of the hydro-electric ghost zapper, you carry a smoking can. Wearing a beekeeper's suit is essential if you want to avoid getting stung. But it's not mandatory.

When inserting and taking out frames from the super, a beekeeper uses long, vented gloves. Flexible when properly fitted and sting proof, gloves protect the worker's hands from bees and the honey's sticky mess. And before approaching the supers, the beekeeper often shoots smoke on the gloves to hide smells that disturb the bees. Bees are sensitive to temperature, sound, and *smell*.

With thick, leather gloves and a smoker, a beekeeper can't go out to battle without a helmet. The hood and veil protects the beekeeper from the weather, as well as the bees. Made of poly-fiber material, veils prevent bees from reaching the face. "Yeah, it protects the face, which is good," stated Ruth, one of Jordan's dome friends who helps her with the bees. "But I can't see a thing." So Ruth only wears gloves. Jordan occasionally wears gloves but prefers to work with her bare hands and never wears a suit. Mike doesn't like gloves or suits but occasionally wears a veil.

I don't like wearing gloves because they're kind of clumsy," explained Ruth. And Mike thought the same. "If you wear a full suit, you don't have the fear of getting stung, so you're prone to be careless and make mistakes," said Mike. "But if you're exposed, you're more careful and considerate of the bees. And they're more considerate of you."

But sometimes bees aren't so considerate, even if you're patient. If you enter the bees' territory, you risk being stung. And if you *do* get stung, whatever you do, don't pull the stinger out. A bee leaves behind a sack filled with venom on top of the stinger. If you pull the stinger, the venom—containing histamine, melittin, and other enzymes—ends up being squeezed into the body. And worse, since the stinger has jagged ends like a fishhook, it's hard to get out. So instead, it's best to take Mike's advice and scrape the stinger off with your fingernail.

But if you're cussing, crying, or irritated at a bee that stung you, don't be. If bees stung at all, they do so only as a defense mecha-

nism. And after the bee leaves the stinger and venom sack in its victim, the bee has an abdominal rupture and dies. The bee sacrificed its life to give you a sting.

Calamine lotion, antihistamines, and topical hydrocortisone are some remedies for a bee sting. But at-home remedies can be just as good—especially if you’re out of Benadryl. My friend who got stung by a wasp made a paste out of baking soda and water. Put a dab of the white gunk to where you got stung and the baking soda will suck the venom out. When Mike was a kid, he used to spit on some mud and put it to his skin. “I don’t know if it worked,” laughed Mike. “I thought it did.”

But now Mike doesn’t make mud and won’t peel you a Band-aid. Instead, he’ll give some tough lovin’: “If you can’t take a bee sting, don’t become a beekeeper.”

Why Bees Don’t Smoke

MANY PEOPLE think that smoke calms bees, but it doesn’t. Instead, the bees go into alarm mode. Workers and drones return to the supers. The pleasant buzzing turns into an intense hum. Bees go into a feeding frenzy and begin gorging on honey, all to store enough energy to move and create a new hive. The smoker isn’t a therapeutic device, it’s an unwanted guest.

“Take forest fires, for instance,” explained Mike. “Smoke is the first thing that kills animals and insects.”

Mike tried using an alternative to smoke—BEE Gone, a chemical repellent of bees. Registered under the Environmental Protection Agency, BEE Gone is a pyretheroid insecticide concentrate—a sprayer that wards off unwanted insects including beetles, spiders, and bees. Mixed with water and applied to the frames’ exterior, Mike repels bees without hurting them when taking out the frames to extract the honey. But after using BEE Gone, Mike decided to stick with his smoker and bee brush. He thinks it’s best to use natural methods rather than an insecticide.

After smoking the bees to get the honey, Mike takes off the wax with a metal comb or a hot knife. For people who don’t like hand tools, high-tech machines are also used to whip off the wax. Beekeepers call the wax *capping* because it caps, covers, and protects the bees’ precious honey.

And beeswax is just as multi-purpose as honey. The fun thing about beeswax,” said Jordan, “is that it’s a reusable resource.” Once the honey is sifted out, the honeycomb wax can be a lubricant for cooking in place of regular oil. Wax can be used as a polish, cosmetic base, and soap. Rubbing beeswax on the edge of dresser drawers can even prevent squeaking.

Once the capping is scraped, melted, or flung off, the frames are put in an extractor—a mechanical spinner that flings honey from twenty frames against a cylinder wall. As the sticky honey oozes down the drum, a screen at the bottom of the cylinder filters out leftover wildflower debris. Because the honey may still contain some wax, Mike doesn’t sell the last batch to customers. He leaves the wax out for the bees instead.

Bee Sex

IN HER LIFESPAN of four to six years, a queen produces a whopping 80,000 to 200,000 future workers, drones, nurses, and field force bees. Procreating and reproducing her whole life, the queen is an egg-laying machine. She is diligent, efficient, and extremely hardworking. But don’t let her glamorous title fool you. The queen starts as a plain old larvae like any other bee.

In early stages of growth, all larvae are fed *royal jelly* secretion produced from the glands on top of a nurse bee’s head. Containing pollen, protein, vitamins, and hormones, royal jelly is important for the larvae to mature. But even if all larvae are given royal jelly at first, the queen gets more. While worker bees are fed royal jelly for only two to three days, the chosen queen eats the delectable secretion for life.

It seems unfair. But the queen was chosen and her cell created long before the nurse bees started distributing royal jelly. When an old queen is weak, dies, or leaves with a swarm, worker bees create a special cell for the queen. Because she is the future reproductive boss of the entire hive, the queen larva is given more royal jelly. Maturing five days earlier and weighing twice as much as a worker bee, the queen doesn’t loaf around—she goes straight to work.

The bees do a little dance. Then they make a little love. But the queen bee gets a lot more lovin’ than I expected.

Emerging from the queen's cell after eighteen days, the queen prepares for the mating flight. Bees, in fact, do it in the air. While flying, the sperm of several different drones are injected into the queen with impeccable coordination. The varying genetic information of the drone bees is then carried by the queen throughout her four-year life span. When the queen lays eggs, fifty percent is the queen's genes and the other half can be the genes from any of several different drones.

Still digesting the topic of flight mating, I wasn't prepared to hear what Mr. McDonald had to say next. "Oh, the women will love this one," he chuckled as he began introducing more reproductive specifics. "The drone has one function, period. He mates with the queen and after they mate, he dies." I stared down at my notepad. "The penis goes into the queen and then the penis is completely separated from the drone." *Good grief, make it stop.* "Then the queen ejects the penis but keeps the genetic matter."

Paralyzed in front of the McDonald Orchard honey stand, I had completed the crash course in bee sex-ed at the Davis Farmer's Market.

Honey for Health and the Truth About Pooh

OH, BOTHER. Pooh's got his head stuck in the honey jar again. And here comes poor little Piglet to pull the jar off his friend's enormous



Bear-shaped honey jars at Mike's stand.

head. The jar flies off. Pooh licks his face. Then he waddles over to the jar, dips his paw, and finishes off the honey. But in reality, Pooh isn't a peaceful bear stuffed with fluff. Bears are the predators of beehives.

"Everybody thinks Winnie the Pooh and those bears are after the honey," explained Mike, with a serious look. "But they are actually after the protein—they're after the larva."

Oh, great. So for all these years Pooh Bear wasn't running after honey. He was eating larva.

"Well," continued Mike, "It's been romanticized about Yogi Bear and all that. But there's nothin' romantic about it—the bears tear the hives apart."

I was somewhat disgusted and my heart was broken. I couldn't picture, let alone want to accept, Pooh as the lovable larva-eater.

But just as Pooh likes his larva, it is considered a delicacy in some parts of the world. Having a high protein source, eating larva can be a huge energy boost. And the health benefits from bees don't stop there.

"A teaspoon of honey will keep allergies away!" exclaimed Mike to customers at his stand. Honey, Claritin, whatever—I thought it was just sales gimmick.

But honey *is* really medicine. The pollen that causes people to sneeze and sniffle is in Mike's honey. "People are often after the local honey," explained Mike, "because it contains the pollen from the area." By taking the pure, unfiltered honey as in Mike's wild-flower recipe, people can build up immunity to pollen.

And it's one of the oldest medicines in existence. In China, stingers, with antibiotic properties, are often used for acupuncture. Bee venom on the stinger can relieve arthritis and help arrest the pains of multiple sclerosis.

Royal jelly, too, has reputed therapeutic qualities—and not just for the queen—people eat it, too. Twenty-one year old Davis student, Maria Choung, has parents that take Royal Jelly (RJ) tablets—a thick, yellowish glue-like paste that has the same proteins and enzymes as the queen's royal jelly.

The jelly, according to the label on the bottle, can be used as a remedy for ailments of the colon, liver, and intestine; skin irritation; and insomnia. Maria's parents take it for their stomach and colon, but her father found that RJ made a significant change in his skin. It's smoother, healthier looking, and it glows. As Mrs. Choung explains, some people are not affected by the Royal Jelly, but Mr. and Mrs. Choung take half a teaspoon twice a day from their jar of Royal Jelly—once before breakfast and once after dinner around ten p.m. For the Royal Jelly to be effective, Maria's mother advises not

to eat too much food at dinner. It's good not to have a full stomach of food before taking the goop.

Mrs. Choung first found out about Royal Jelly from a friend at church who orders the bottles straight from Korea, where it's a big hit. Health-conscious and liking organic and natural remedies, Maria's mother began ordering it and has now been using RJ for almost a year.

My Lessons as an Amateur Beekeeper

SO AFTER LEARNING about supers, smokers, and bee-sex, I was ready for the beekeeping challenge. I went to the Domes, met with Jordan, and got some first-hand experience as a beekeeper. Before heading out to the hive boxes, Jordan gave me a quick run-through on how I should dress.

"You should wear socks, long pants, and long sleeves." I was wearing flip-flops, a pair of capris, a bulky tank top and my green three-quarter-sleeve sweater. As a beekeeping novice, I was in no condition to go out and greet bugs with stingers.

While I stared at my exposed toes, Jordan searched for some extra clothing. By the time I finished changing, I sported an old dress shirt far too small for me, yellow-striped knee-high baseball socks, and some pants. I had to tuck the pant legs into the socks so the bees wouldn't fly up my pants. The only protective gear that made me resemble a beekeeper was the veil.



Yuko Query (left) and Jordan Thompson (right) ready for battle.

"If you get a bee stuck in there," explained Jordan looking at my veil. "Just go ahead and kill it." *Fantastic*. I was going to have to crush a bee from the inside of the veil. "And if you don't kill it," continued Jordan. "It's going to sting your face."

Jordan led the way through the dense path of dried grass. Even before I saw the hive boxes and was far from being stung, star thistle—the same flower that Mike uses in his wildflower recipe—pierced its way through my socks and made walking a pain.

Approaching two white hive boxes, Jordan cussed. I looked closer and saw rows of ants invading the side of the supers. Jordan tilted her head up and groaned. I wasn't there just to take pictures and quote her. We had serious work to do.

She placed two saucers filled with water on the bottom corners of the supers so the ants wouldn't be able to climb off the box. Grabbing the bee brush, Jordan brushed the sides of the boxes and smashed the rest of the ants with her fingers. "If I were an ant," Jordan said. "I'd like honey, too." We couldn't blame the ants for trying.

After the ants were settled—dead—Jordan opened the upper box and drew out a frame. It was empty. The wax was bare and only a few bees wobbled between the frames. Lifting the upper box and opening the lower super, Jordan pulled out another frame. It was covered with bees and best of all, loaded with honey. The first hive box was definitely a success.



Jordan lifts a honey-filled frame.

Closing the lid and reassembling the super, Jordan and I moved to the second hive box. Like the first super, the top frames were empty. Moving onto the lower hive box, Jordan opened the lid and cussed again—this time, more profusely.

Three frames had been missing in the lower box. Lifting the lid, we saw that the bees had taken advantage of the open space, making a huge comb on the roof of the super's lid. Jordan flipped the lid over and rested it on top of the first super. The combs were divided into three sections—each about an inch and a half wide and



Roof-top comb mayhem.

well over a foot long. Ants were nothing compared to this problem: We had a mound of bees that had to be transferred back to its original frames.

Jordan began brushing the bees off the comb with the bee brush.

“Here, take this,” she said, handing me the brush and pointing to the back

side of the comb. “Brush the bees off the wax as much as you can.” I faced the mound of bees and slowly swept the sides of the comb. To my surprise, the bees didn’t fly up agitated with my brushing, but fell down the comb like a crumbling of sand castle.

After brushing off some bees, Jordan carefully scraped the bottom of the comb that oozed with honey and licked her scraper. Detaching the first two sections from the lid, she grabbed a new frame and rested the combs on its sides.

“Hold this,” she said, giving me the frame and grabbing a ball of brown yarn from her basket. As I held the frame, Jordan wrapped the yarn around the comb.

Looking at the last mound still left on the lid, I searched for the queen. “I’ve never seen the queen before, but I bet she’s in there somewhere,” said Jordan eyeing the bees on the comb. “Kinda’ like ‘Where’s Waldo?’ isn’t it?” Then she broke off a piece of wax and popped it in her mouth.

My attention moved from the comb to Jordan’s chewing. “It’s the best kind of candy,” she said after spitting out a mouthful of wax. “Here, try some.”

I chewed the comb, sucked out the honey, and spit out the wax like a ball player spitting out his tobacco. The wax didn’t even stick

to my teeth. Jordan was right. It was the best kind of candy. After feasting on honey-filled wax, we detached the last comb and tied it to the frame. Then Jordan spotted the queen.

"There she is!" she exclaimed, pointing to a mound of bees. "There, right there!"

"Where?" I shouted, holding the frame. I knew she was right under my nose.

Then there she was. The queen with her large abdomen wiggled among the worker bees then disappeared underneath the comb. Jordan and I were satisfied. We had seen our first queen. Placing the final frame into the lower hive box, our job was complete. We put the boxes back together, gathered our belongings, and headed back to her dome.

I was hot, sweaty, and exhausted. But after lifting frames, brushing off bees, using the smoker, spitting out wax, and meeting the queen, I felt like a true beekeeper.

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<<http://www.capayvalleyvision.org/cvgmcdonald.pdf>>

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Online Resources:

BeeCARE. <www.Becare.com>

"Equivalents to U.S. Recipe Measurements." *The Gumbo Pages*. <<http://www.gumbopages.com/metric.html>>

"Bee alert! Bee trivia." University of Montana website. <<http://www.umt.edu/biology/bees/Trivia.HTM>>