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Vero Beach beekeepers and their partners at the Indian River Land Trust are as busy as their beloved honey bees

Bee Mine

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BEE CULTURE IS ABUZZ IN VERO BEACH

BY CHRIS FASOLINO

It was the ideal retirement project for a man of intellect and curiosity.

That, at least, is what Sir Arthur Conan Doyle decided when he thought about what retirement would be like – not for himself but for his famous fictional detective, Sherlock Holmes. In Doyle's later stories, Holmes retires to the countryside along the English coast and takes up beekeeping. Naturally, the brilliant and eccentric Holmes applies the same kind of deductive reasoning and enthusiastic curiosity to his beehives as he had to his cases. In the story entitled "His Last Bow," wherein he temporarily comes out of retirement to outwit a German spy, Holmes shows Watson a book he has written about honeybees. "Here is the fruit of my leisured ease," Holmes says, "the magnum opus of my latter years!" The book is entitled The Practical Handbook of Bee Culture, with some Observations upon the Segregation of the Queen. Holmes explains that he researched the book by watching the honeybees in his peaceful countryside apiaries as closely as he had once watched the criminal underworld of London.

The honeybee does indeed merit such close observation. In fact, the title Holmes chooses for his book (all right, the title Doyle has him choose) is an intriguing one that may have multiple layers of meaning. "Bee culture" applies to the agricultural pursuit of keeping honeybees, but it could also suggest that Holmes perceives the complex social behavior of these creatures as a culture in itself – which would fit with his reference to observing them as closely as he had once observed London criminal networks.

Bee culture, in either sense of the phrase, is widely practiced in Vero Beach. Some local beekeepers work with many hives, others with

COURTESY OF INDIAN RIVER LAND TRUST

Nick Grasso keeps 120 hives on Indian River Land Trust property.

few, but all must be observant of the natural behavior of honeybees in order to be successful.

The Treasure Coast Beekeepers Association covers all of Indian River County as well as Brevard and Martin counties. Association President Andy Harrell of Palm Bay notes that membership currently includes about 50 beekeepers. Among them, those 50 beekeepers have between 500 and 600 hives. Members range from "backyard beekeepers" with one or two hives to commercial beekeepers with numerous hives. A club apiary located in St. Lucie County serves as a teaching beehive for new members and other interested people, with events typically held on the first and third Saturdays of the month and schedules posted on the website tcbeekeepers.org.

One member of the Treasure Coast Beekeepers Association is Gary Brabant of Fellsmere, who, along with his wife, Mary, has approximately 30 hives. Like Sherlock Holmes, Brabant became a beekeeper as a retirement project. "I've always had an interest in bees," Brabant recalls. "When I retired I figured I could do beekeeping as a hobby – and then, like any hobby, it just expands." He adds with a smile, "It becomes more work than hobby, but you still enjoy it."

One of the decisions a beekeeper needs to make early on is what kind of bees he plans to raise. While the honeybee (Apis mellifera) is a single species, there are more than 20 subspecies. Brabant primarily raises the Italian subspecies, noting that they are fairly gentle in addition to being good honey producers. However, subspecies can interbreed, so there is hybridization among honeybee subspecies, adding to the complexity.

Even within the same subspecies, different hives have different personalities. Some are very gentle, especially "on a nice sunny day," Brabant says. The bees are "just flying around, looking for nectar sources." Other hives are highly defensive. "You just go near them and the guard bees become aggressive."

Guard bees? Yes, the highly organized social structure of an apiary does include security. Guard bees – also called sentinel bees – are posted at the entrances of beehives. They examine bees that are seeking entry to determine whether they have the scent of that particular hive. If they do, the sentinels allow them to pass. If not, the sentinels eject them. Such vigilance is needed since bees sometimes try to steal nectar and honey from other hives. In addition, the sentinel bees protect the hive from other insect intruders, such as wasps. (The University of Sussex website, atsussex.ac.uk/lasi/resources/education/whatbeesdo/beebehaviour, has an intriguing video of sentinel bees working together to defeat a larger wasp).

Another fascinating aspect of bee culture is communication. "A lot of it is motion," says Brabant, referencing the famous "dance" of the honeybees. "Scout bees go out looking for a food source. When they come back, they dance around in a circle and fan their wings." Somehow, these motions form a kind of code or language, informing other bees in the hive of the direction of the food source.

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Gary Brabant, shown here examining a honeycomb, got into beekeeping as a retirement hobby.

The intricacies of honeybee communication are fascinating, and close observation has given humans some insights into how their code works. For example, the shape of the dance begins to narrow down the distance; the bee dances in a circle if the food source is approximately 300 feet away or less, while making a more elaborate figure-eight motion, known as the "waggle dance," if the food source is farther away. The speed of the waggle dance seems to give additional information regarding distance: nine circuits in 15 seconds translates as approximately 600 feet away; five circuits in 15 seconds is approximately 3,000 feet away; and three circuits in 15 seconds is approximately 6,000 feet away. The direction of the food source is indicated by the direction the bee faces during certain portions of the dance, with the bee's direction corresponding to the course it flew, in relation to the position of the sun, when it found the food source. If this sounds complex, that's because it is. The Austrian biologist Karl von Frisch, who won a Nobel prize for his work decoding honeybee dance language (research which included marking bees with tiny dots of paint in order to track their movements), called this form of communication "one of the most amazing occurrences in the insect world," adding, "That's saying a

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When bees decide to take up residence in an area humans have already claimed, Brabant is often called on to relocate the bees to a less developed location.

lot." He also said that "the bee's life is like a magic well: The more you draw from it, the more it fills with water." In other words, the more we learn about bee culture, the more we realize that there is still more to discover.

The intricacies of honeybee social structure are also apparent in another aspect of Brabant's work: bee removal. Clients call upon Brabant to remove bees from locations where they are not wanted. "I've recovered bees from inside knot holes in oak trees, block walls of homes, under mobile homes and on trees 30 feet up in the air." Calling it an exciting part of his job, Brabant says, "You have to be aggressive in getting them out, but gentle with the bees." A special type of vacuum can be used to remove and contain the bees for transport. Another option is to connect a cone to the hive entryway, with the other end of the cone leading to the box. But in addition to the mechanics of such tools, bee removal is highly strategic and relies upon the importance of the queen.

The queen bee, as a fertile female, stands in contrast to the rest of the hive's population, which consists of worker bees, which are all females not capable of reproducing, and male drones, whose sole function is to mate with the queen. A single queen bee can lay approximately 1,500 eggs in one day, making her the source of entire generations of bees for her hive.

Thus, in bee removal, "the primary focus is to capture the queen. Then, 90% of the job is done." This is because the rest of the hive will follow the queen. Such is the "political structure" of bees. It is also important to move the bees far enough away so that they will not return to the site. In Brabant's view, that means at least 3 miles. "Some people say 2 miles, but I'm a believer in 3 miles or more."

The need for bee removal comes about because at certain times of the year, bees will swarm in search of a new home. "A swarm begins when bees determine that their hive is overpopulated." As a result, the hive will divide of its own accord, and that means a new queen is required. Special cells within the hive are constructed by worker bees. In these cells, the queen lays eggs, the larvae from which will be fed with large quantities of royal jelly, a secretion rich in proteins and sugars. This stimulates the development of the larvae, making them fertile; therefore, one will become the next queen. A similar process takes place when a hive determines that the current queen is weak, triggering the need for a replacement.

When the swarm is about to begin, the old queen will leave the hive. She will be followed by up to half of the hive's total population, constituting the swarm. Scout bees are sent out ahead, and the swarm finds a place to rest until the scouts return with information about promising locations. Like information about food sources, this knowledge is conveyed via the dance. Evidently, the more energetic the dance, the more desirable the potential location is. Ultimately, scout bees can lead the entire swarm to a new home.

The process is an amazing natural cycle in itself. However, problems arise when a swarm settles on a new home that is already in use by humans. Brabant advises homeowners to check for cracks and openings in a house and to seal them, noting that bees can enter through a crevice as small as one-quarter of an inch in width.

And what about that sweet reward of beekeeping – honey? Bees make honey from the nectar of flowers in order to have a food supply for their hive; however, the harvesting of honey is possible because, with their proverbial industriousness, bees can make far more honey than their hive needs. Thus, human beekeepers can take some while still leaving an ample supply for the bees.

Honey can have varied flavors according to the source of nectar. Brabant's honey, which is rich and flavorful, is labeled as "wildflower" because the nectar comes from a variety of sources. "I see them on honeysuckle flowers and on jasmine." There are orange groves near Brabant's farm as well, but to legally label a honey as "orange blossom honey" requires laboratory testing to determine the nectar's origin. "I'm not going to go through that," he laughs. "I'm a hobby beekeeper, this is my retirement plan." So "wildflower honey" it is.

The natural storage process of honey is also of great interest. Bees construct honeycombs using bees-

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A view of one of Gary Brabant's apiaries suggests the densely populated society and complex social structure of honeybees.

wax, a substance produced from glands in their bodies. The hexagonal geometry of the honeycomb is ideal for storing the greatest amount of honey in the space available. The thin walls of the honeycomb cells can support 30 times their own weight. Thus, honeybees instinctively display skills that humans would categorize as engineering, architecture and mathematics.

With concerns about threats to pollinators worldwide, how are bees faring locally, and what can people do to help them? Andy Harrell is optimistic about the well-being of honeybees on the Treasure Coast. "We have our losses and gains," he says. "I think we do a decent job of dealing with varroa mites and hive beetles," referencing pests that can be major threats to honeybees.

Another local organization helping bees and beekeepers is the Indian River Land Trust. The mission of the Land Trust is to acquire environmentally important land in order to protect it from development, and some of those properties are made available to beekeepers. "We have four different beekeepers working in three different properties," says Dave Fuss, director of land stewardship for the Indian River Land Trust. "It helps us because it helps to pollinate our native plants." The Land Trust has also held educational events in partnership with the Gifford Youth Achievement Center, in which children have visited the apiaries for a beekeeping demonstration. "The kids really loved it – and the adults loved it, too."

Nick Grasso, a beekeeper who has 120 hives on Land Trust property, notes that his bees are thriving as a result of the arrangement – and they are pollinating the mangroves. "It's good for the bees and good for the mangroves. It works both ways." The symbiotic nature of the relationship is appropriate to bees and beekeeping. "It's hard to find natural habitat for the honeybee because of development," Grasso adds. "Natural habitat is vanishing. Thankfully, the Land Trust has these lands for us," helping to support the honeybee population.

Robb Greenfield, another local beekeeper benefitting from the Land Trust's hospitality, agrees. "The Land Trust understands the value of honeybees outside of honey." Greenfield learned the art of beekeeping from Greek mentors. He notes that despite its comparatively small land mass, Greece has about the same number of honeybees as the United States, due to its rich traditions of bee culture. He has a farm of his own in Fellsmere, where he first began to keep bees. However, as his beekeeping enterprise expanded, he

began working with the Land Trust and now keeps approximately 70 hives on one of its properties. "The Land Trust takes green spaces and protects them," he says, which is all to the good "for beekeepers, and for Florida."

Gary Brabant also notes that we can all do more to support the native bee population. While the bees used in beekeeping are all subspecies of Apis mellifera, the European honeybee, there are also wild species, native to North America, that are found in our area. With wild bees in mind, Harrell notes, "We need to be more natural in dealing with our yards." He recommends that homeowners avoid pesticide use and select native plants for their yards and gardens.

Brabant concurs: "If you're going to use anything on your plants, make sure it's organic and not harmful to bees." Such methods can help butterflies as well as bees. "There are 280 different pollinators in Florida alone. They all need protection, and they all need help."

Where human interference is not excessive, Brabant has faith in the resilience of bees. "They need a good, healthy population, water and plenty of nectar-producing flowers. Then they're pretty much self-sustaining. They're incredible."

With their complexities of social structure, their language of coded motions and their instinctive architectural skills, bees are indeed fascinating creatures. They could absorb and fully merit the observation of the greatest of detectives. As Treasure Coast beekeepers well know, there is always more to discover about the world of bee culture. ❀

MARTINA TANNERY

Dave Fuss, the Indian River Land Trust's director of land stewardship